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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Douglas R. Svenson

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ALSTON & BIRD LLP

BANK OF AMERICA PLAZA

101 SOUTH TRYON STREET, SUITE 4000

CHARLOTTE, NC 28280-4000

EXAMINER

WHITE, EVERETT NMN

ART UNIT

PAPER NUMBER

1623

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/797,938	<b>Applicant(s)</b> SVENSON ET AL.	
	<b>Examiner</b> EVERETT WHITE	<b>Art Unit</b> 1623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 5, 2009 has been entered.
2. The amendment filed May 5, 2009 has been received, entered and carefully considered. The amendment affects the instant application accordingly:
  - (A) Comments regarding Office Action have been provided drawn to:
    - (I) 103(a) rejection, rendered moot by new ground of rejection over newly cited US Patent.
3. Claims 1-48 are pending in the case.
4. The text of those sections of Title 35, U. S. Code not included in this action can be found in a prior Office action.

### ***New Ground of Rejection Claim Rejections - 35 USC § 103***

5. Claims 1-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heikkila et al (US Patent No. 6,512,110, already of record) in view of Roymoulik et al (US Patent No. 3,832,276, newly cited) or Turner (US Patent No. 4,294,654, already of record).

Applicants claim a method of producing xylose from a cellulose material containing hemicellulose, comprising: providing a pre-hydrolyzed cellulose pulp that is at least partially bleached and has a hemicellulose content that is predominantly xylan, and has a lignin content that is less than 1 wt.%; extracting the hemicellulose from the at least partially bleached pulp into a caustic solution thereby forming a hemicaustic solution; separating the hemicaustic solution into a concentrated hemicellulose solution

and a concentrated caustic solution; and, hydrolyzing the hemicellulose from the concentrated hemicellulose solution to produce xylose.

The Heikkila et al patent discloses a process for the production of xylose from a paper-grade, hardwood pulp. More specifically, the Heikkila et al patent disclosed that the invention thereof relates to a process wherein the xylan contained in said pulp is extracted using an aqueous solution of a xylanase enzyme. Optionally, the process also comprises one or two alkali treatments. Heikkila et al discloses that the xylose is obtained by a hydrolysis of the xylan extracted from the pulp. Heikkila et al discloses that the paper-grade hardwood pulp used as raw material is preferably soda pulp or kraft pulp (see column 1, lines 8-16). See column 12, 2<sup>nd</sup> paragraph for the procedure used to separate the hemicaustic solution into a caustic solution and a hemicellulose solution (i.e., xylan). The Heikkila et al patent teaches that hardwood pulp comprises hemicellulose at 25-35% (see column 1, lines 50 and 51), which embraces a pulp having greater than 4 wt% of hemicellulose as set forth in instant Claim 2. Also see column 2, 2<sup>nd</sup> paragraph wherein the Heikkila et al patent further teaches a method of removing pulp using bleaching and alkaline extraction. In this paragraph, Heikkila et al discloses that "bleaching" is the removal of color from pulp, primarily the removal of traces of lignin, which remains bound to the fiber after the primary pulping operation. Heikkila et al teaches that bleaching usually involves treatment with oxidizing agents, such as oxygen, peroxide, chlorine, or chlorine dioxide. Classically, the pulp is treated with chlorine, then extracted with caustic, and finally treated with hypochlorite. The alkaline extraction may be with either hot or cold caustic. Heikkila et al teaches that the relative merits of extraction with cold, versus hot, caustic are discussed at length by M. Weyman in *The Bleaching of Pulp*, W. Howard Rapson, editor, TAPPI Monograph Series No. 27 (1963), Technical Association of the Pulp and Paper Industry, New York, N.Y., Chapter 5, pp. 67-103. Weyman concludes that cold caustic extraction is the superior method for xylan removal from pulp. Other procedures disclosed in the Heikkila et al patent that can be used to recover xylan include filtration, centrifugation, or the like (see column 7, 4<sup>th</sup> paragraph) and nanofiltration (see column 7, 5<sup>th</sup> paragraph). It is also noted that the aqueous caustic treatment in the Heikkila et al patent may be

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performed at a temperature of 50°C (see column 6, line 46), which is within the range of the temperature of the caustic solution set forth in instant Claim 9. Also see the xylan composition set forth in Example 18 of the Heikkila et al patent which comprises a xylose content of 91.4% which embraces the requirement of instant Claim 23 wherein the hemicellulose has a xylose content of greater than 90 wt%.

Applicants amended the claims by reciting that the pre-hydrolyzed cellulose pulp also has a lignin content that is less than 1 wt.%, which is not specifically disclosed in the Heikkila et al patent.

However, the Roymoulik et al patent, which discloses delignification and bleaching of cellulose pulp slurry with oxygen, shows that cellulose pulp having a lignin content that is less than 1 wt.% is known in the art by disclosing in Table 2 a bleached hardwood dissolving pulp that has a kappa No. of 3.3. The low kappa No. of 3.3 suggests that the pulp has a lignin content that is less than 1 wt.% as instantly claimed.

The Turner patent also discloses delignification and bleaching of cellulose pulp and further shows that the use of prehydrolyzed hardwood pulp is known in art. See column 3, 2<sup>nd</sup> paragraph, wherein prehydrolyzed hardwood pulp is used to prepare lignocellulosic pulps.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the pulp used in the process for the production of xylose from hardwood pulp of the Heikkila et al patent with prehydrolyzed hardwood pulp or pulp that has a lignin content that is less than 1 wt.% in view of the recognition in the art, as evidenced by the Roymoulik et al and Turner patents, that prehydrolyzed hardwood pulp and pulp having low lignin content allows for greater ease of the raw material for the preparation paper products.

One having ordinary skill in the art would have been motivated to combine the teaching of the Heikkila et al patent with the teachings of the Roymoulik et al and Turner patents in order to reject the instant claims under 35 U.S.C. 103 since each of documents disclose treatment of cellulose pulp materials for industrial applications such as the preparation of paper products.

6. Applicant's arguments with respect to Claims 1-48 have been considered but are moot in view of the new ground(s) of rejection.

***Reference cited to further show the state of the art***

7. The Tan patent (US Pat. No. 6,485,667), which disclose wood pulp having a lignin content of less than about 1 percent, wherein pulp having a Kappa value of about 1.1 has a lignin content of about 0.15 percent, and a pulp with a Kappa value of about 0.97 has a lignin content of about 0.12 percent, is cited to further show the state of the art.

***Summary***

8. All the pending claims (1-48) are rejected.

***Examiner's Telephone Number, Fax Number, and Other Information***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Everett White whose telephone number is 571-272-0660. The examiner can normally be reached on 9:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shaojia A. Jiang can be reached on 571-272-0627. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Everett White/  
Examiner, Art Unit 1623

/Shaojia Anna Jiang/  
Supervisory Patent Examiner, Art Unit 1623